DESCRIPTION

PLASMA DISPLAY PANEL WITH SUPERIOR LIGHT-EMITTING CHARACTERISTICS, AND METHOD AND APPARATUS FOR PRODUCING THE PLASMA DISPLAY PANEL

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FIELD OF THE INVENTION

This invention relates to a plasma display panel used as a display for a color television receiver or the like, and also relates to a method of producing the plasma display panel.

BACKGROUND OF THE INVENTION

Recently, Plasma Display Panel (PDP) has received attention as a large-scale, thin, lightweight display for use in computers and televisions, and the demand for high-definition PDPs has also increased. Document EP0554172A1 discloses a conventional, typical technique related to a construction and production method of PDP.

FIG. 29 is a sectional view showing a general AC-type PDP.

In the drawing, a front glass substrate 101 is covered by a stack of display electrodes 102, a dielectric glass layer 103, and a dielectric protecting layer 104 in the order, where the dielectric protecting layer 104 is made of magnesium oxide

be heated in each process. In contrast, in the present invention, these processes are performed without lowering the temperature to room temperature. This reduces the time and energy required for heating.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional view of the main part of the AC-type discharge PDP of Embodiment 1.

FIG. 2 shows a PDP display apparatus composed of the PDP shown in FIG. 1 and an activating circuit connected to the PDP.

FIG. 3 shows a belt-conveyor-type heating apparatus used in Embodiment 1.

FIG. 4 shows the construction of a heating-for-sealing apparatus used in Embodiment 1.

FIG. 5 shows measurement results of the relative light-emitting intensity of light emitted from the blue flourescent substance when it is baked in air with different partial pressures of the steam vapor contained in the air.

FIG. 6 shows measurement results of the chromaticity coordinate y of light emitted from the blue flourescent substance when it is baked in air with different partial pressures of the steam vapor contained in the air.

FIGs. 7A to 7C show measurement results of the number of molecules in H_2O gas desorbed from the blue fluorescent

substance.

FIGs. 8 to 16 show specific examples of Embodiment 2 concerning: the position of the air vents at the outer regions of the back glass substrate; and the format in which the sealing glass frit is applied.

FIGs. 17 and 18 shows the characteristic of how the effect of recovering the once-degraded light-emitting characteristics depends on the partial pressure of steam vapor, where the blue flourescent substance layer is once degraded then baked again in air.

FIG. 19 shows the construction of a bonding apparatus used in the bonding process of Embodiment 5.

FIG. 20 is a perspective diagram showing the inner construction of the heating furnace of the bonding apparatus shown in FIG.19.

FIGs. 21A to 21C show operations of the bonding apparatus in the preparative heating process and the bonding process.

FIG. 22 shows the results of the experiment for Embodiment 5 in which the amount of steam vapor released from the MgO layer is measured over time.

FIG. 23 shows a variation of the bonding apparatus in Embodiment 5.

FIG. 24A to 24C show operations performed with another variation of the bonding apparatus in Embodiment 5.

FIG. 25 shows spectra of light emitted from only blue cells of the PDPs of Embodiment 5.

FIG. 26 is a CIE chromaticity diagram on which the color reproduction areas around blue color are shown in relation to the PDPs of Embodiment 5 and the comparative PDP.

FIGs. 27A, 27B, and 27C show operations performed in the temporary baking process through the exhausting process using the bonding apparatus of Embodiment 6.

FIG. 28 shows the temperature profile used in the temporary baking process, bonding process, and exhausting process in manufacturing the panels of Embodiment 6.

FIG. 29 is a sectional view showing a general AC-type PDP.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

<Embodiment 1>

FIG. 1 is a sectional view of the main part of the AC-type discharge PDP in the present embodiment. The figure shows a display area located at the center of the PDP.

The PDP includes: a front panel 10 which is made up of a front glass substrate 11 with display electrodes 12 (divided into scanning electrodes 12a and sustaining electrodes 12b), a dielectric layer 13, and a protecting layer 14 formed thereon; and a back panel 20 which is made up of a back glass substrate 21 with address electrodes 22 and a dielectric layer